

PATENT SPECIFICATION

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Index at Acceptance :—Class 36, A12, C3(A : X).

COMPLETE SPECIFICATION.

Improvements in or relating to Electric Cables and Wiring Systems.

We, CABLES AND PLASTICS LIMITED, of Manston Lane, Crossgates, near Leeds, in the County of York, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to electric cables, which may be for electric power, telephone or signalling systems or the like, of the type known as catenary cables in which a supporting wire is provided for furnishing the necessary mechanical tensile strength for the cable to be stretched between supporting points.

Usually so-called catenary cables have a catenary wire to be stretched between supporting points and the conductor cable itself is secured thereto by taping, clips or other securing means. In this instance the catenary wire and cable are two separate entities to be associated but it is known to provide a catenary wire running through the centre of the cable in close proximity to, or surrounded by, the electric conductors. It is also known to provide a so-called earthing conductor which is permanently connected to earth in an electric system and forms an outer casing for the cable with the necessary mechanical tensile strength.

According to the present invention there is provided an electric catenary cable, including at least one electric current carrying conductor and at least one catenary wire laid parallel therewith and slightly spaced therefrom, said conductor and wire being embedded in an extruded common insulative sheath, the arrangement being such that the conductor lies fully within the main body part of the sheath and the, or each, catenary wire is fully enclosed within a substantial ridge forming an integral part of the sheath. The

catenary wire with its insulative sheath may be separated from the main cable where required to facilitate the suspension of the cable in position. Alternatively, or additionally, the ridge on the cable is made so that the cable can readily be secured at required points by means of cleats, clips, or like fixing means which grip the ridge in close proximity to the cable proper without any fear of damage to the sheath enclosing the conductor or conductors.

Any number of electric conductors may be provided within the cable and such conductors may each be furnished with an insulative covering of polythene or polyvinyl chloride, and the cable sheath may be of polyvinyl chloride.

The improved cable according to this invention may be used in a wiring system and connected up to a junction box at which point the catenary wire may be severed and the insulating sheath slit back on each side of the cut so as to enable the covered catenary wire to be secured by cleats or other fixing means to a structure adjacent the junction box, or even the junction box itself. The catenary wire in its sheath may be separated from the cable and looped to be held by means on the junction box or an adjacent structure leaving the conductors to be passed into the junction box in known manner.

Referring now to the accompanying drawing, in which :—

Fig. 1 is a side view of a length of cable constructed according to the invention ;

Fig. 2 is a sectional end view of Fig. 1 ;

Fig. 3 is a side view of a length of cable with a loop support fixed to a structure ;

Fig. 4 is a side view showing a length of cable with alternative clip supporting means ;

Fig. 5 is a part end view of Fig. 4 ;

Fig. 6 is a side view of a length of cable

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with further alternative cleat supporting means;

Fig. 7 is an end view of Fig. 6;

Fig. 8 is a view showing how the cable may be secured to a junction box; and

Fig. 9 is a sectional view of a cable with two catenary wires.

In the particular embodiment of this invention shown in Figs. 1 and 2, the improved electric catenary cable has three conductors 2 of usual form and covered by, say, polythene or other insulative material laid in a covering of polyvinyl chloride 3 or other insulative material which forms the outer sheath of the cable. The section of the cable is round but with an integral projecting ridge 4 of the polyvinyl chloride sheath housing a catenary wire 5, which can be of stranded formation. In this manner a cable so constructed can have cleats or clips or other securing means furnished to grip the ridge 4 cored by the wire 5 so that no damage is done to the cable proper but it can be easily suspended or stretched between desired supporting points. Alternatively as shown in Fig. 3, the cable can have the ridge 4 slit away from it for part of its length where required to form a shallow or deep loop 6 which can be either simply hung or secured on supporting means such as by hanging the loop 6 on a hook 7 or have supporting means secured thereto. When the ridge with the catenary wire is so separated the catenary wire will still be entirely covered by the insulative sheath and there will be a complete sheath around the insulated conductor or conductors.

A particularly suitable type of clip for securing the catenary cable is shown in Figs. 4 and 5 and comprises a pair of complementary plates 8, 9 which when secured together provide gripping tongues or flanges 10, 11 to embrace the ridge 4 containing the catenary wire. These plates may have dished or otherwise formed spacing parts although preferably, as shown, they are of flat formation and the gripping tongues or flanges run along opposite lower edges. Said plates are held together by a bolt 12 (or other securing device) and have auxiliary securing means 13 and locating means in the form of lugs 14 projecting into holes 15. Such device may be secured to a fixing bracket 16 or other means or structure. When the catenary cable reaches a junction box it can be severed, the insulating sheath can be slit back to separate the ridge enclosing the catenary wire from the cable proper and a cleat or other means furnished to secure the catenary wire and thus the cable with the required mechanical tensile strength between the fixing points. The cable proper is entered into the box for electrical connection in known manner. In a convenient arrangement as shown in Figs. 6 and 7, a cleat 17 is constructed so that the ridge 4 housing the

catenary wire is gripped by complementary tongues or flanges along say the lower edge 18, passed round one end 19 and turned back along an opposite edge 20 so that in effect it becomes hook-shaped in formation with the cleat having a good grip thereon to take the strain. The cleat may be secured to a fixing bracket or other means or structure as aforesaid. The complementary tongues or flanges may extend on three edges or right round the cleat plate according to requirements. Any of the cleats may be constructed to facilitate the grip on the sheath enclosing the catenary wire by crimping it, serrating it, furnishing complementary indents and projections or any other means which will give a good grip on the sheath according to requirements. The bracket which supports the cleat can also be adapted to carry a junction box or other device or the bracket may carry more than one cleat according to requirements. Although these cleats have been found eminently suitable for securing the catenary wire any other form of securing device may be adopted as required.

In a modification shown in Fig. 8, for securing a cable to a junction box, the catenary wire cored ridge 4 is slit away from the cable proper 3 to furnish a deep loop 21 which can be gripped by a securing collar 22 and passed over a grooved or other roller 23 within the collar carried by a junction box 24 or adjacent structure.

In some cases additional support for the conductors may be required and conveniently two catenary wires may be provided. A suitable arrangement is shown in Fig. 9. Three insulated or bare conductors 2 are embedded or encased in the covering 3 having two integral diametrically opposite ridges 4a housing stranded or other catenary wires 5. Narrow longitudinal grooves 25 are shown in the covering at the roots of the ridges to facilitate the slitting of the covering to separate the catenary wires from the cable but these are not essential. This catenary cable with dual suspension wires may be used in many instances and is particularly suitable for use on a vertical drop, say down a mine shaft, where support must be given to the cable at spaced points. The two suspension wires provide a balanced and simple method, suitable for clamping on to each of the suspension wires leaving the conductor section of the cable free from all encircling clamps.

In some instances the suspension wire (or wires) is required to be used to provide earthing facilities for the gear to which the cable is connected, in which case the suspension wire must have certain resistance characteristics, in relation to that of the conductor (or conductors) being supported. For example, a few strands of high tensile steel are used, and copper or aluminium strands added to

produce the required value. A suspension wire may consist of seven strands of high tensile steel round which are laid twenty-two strands of copper in a smaller gauge, so that the value of resistance figure per unit length is correct in relation to that provided by a unit length of the smallest conductor being supported.

What we claim is :—

1. An electric catenary cable, including at least one electric current carrying conductor and at least one catenary wire laid parallel therewith and slightly spaced therefrom, said conductor and wire being embedded in an extruded common insulative sheath, the arrangement being such that the conductor lies fully within the main body part of the sheath and the, or each, catenary wire is fully enclosed within a substantial ridge forming an integral part of the sheath.

2. An electric catenary cable according to Claim 1, wherein the formation of the ridged part of the sheath enclosing the catenary wire is such that it may be separated from the main cable by slitting where required along a line at the root of the ridge to facilitate the suspension of the cable in position.

3. An electric catenary cable according to Claim 1, wherein the ridge is constructed so that the cable can readily be secured at required points by means of cleats, clips, or like fixing means which grip the ridge in close proximity to the cable proper without any fear of damage to the sheath enclosing the conductor or conductors.

4. An electric catenary cable according to any of the preceding claims, wherein each conductor is furnished with an extruded insulative layer, e.g., polythene or polyvinyl chloride and the common insulative sheath comprises polyvinyl chloride.

5. An electric catenary cable according to any of the preceding claims; in combination

with one or more clips, or cleats or equivalent fixing means for securing the cable in position.

6. The combination according to Claim 5, wherein each clip or cleat includes two plates having complementary gripping tongues or flanges to receive the covered catenary wire.

7. The combination according to Claim 6, wherein the gripping tongues or flanges have serrations, indents or like projections to afford a good grip on the covered catenary wire.

8. The combination according to either of Claims 6 or 7, wherein the gripping tongues or flanges extend in one or more directions along the cleat.

9. An electric catenary cable according to any of the Claims 1 to 4, in combination with means for fixing the cable to a junction box, said means including a support or bearing with a concentric collar, the covered catenary wire being separated from the covered conductor and passing between said support or bearing and the collar to form a loop in the said wire.

10. The combination according to Claim 9, wherein the support or bearing is grooved or shaped to receive the wire.

11. An electric catenary cable substantially as described with reference to Figs. 1 and 2 or Fig. 9 of the accompanying drawing.

12. The combination of an electric catenary cable and fixing means substantially as described with reference to Fig. 3 or Figs. 4 and 5, or Figs. 6 and 7, or Fig. 8, of the accompanying drawing.

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PROVISIONAL SPECIFICATION.

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Usually so-called catenary cables have a catenary wire to be stretched between supporting points and the conductor cable itself is secured thereto by taping, clips or other

securing means. In this instance the catenary wire and cable are two separate entities to be associated but it is known to provide a catenary wire running through the centre of the cable in close proximity to, or surrounded by, the electric conductors. It is also known to provide a so-called earthing conductor which is permanently connected to earth in an electric system and forms an outer casing of the cable with the necessary mechanical tensile strength.

According to the present invention there is provided an electric catenary cable, including at least one current carrying conductor embedded in an insulative covering and at least one catenary wire laid parallel with and

spaced from the conductor but embedded in the same covering to form an integral ridge along the normal cable covering. The formation of the ridged cable may be such that the catenary wire with its insulated covering may be separated from the main cable where required to facilitate the suspension of the cable in position. Alternatively, or additionally, the ridge on the cable is made so that the cable can readily be secured at required points by means of cleats, clips, or other fixing means which grip the ridge with its catenary wire core without any fear of damage to the cable covering of the conductors. Any number of electric conductors may be provided within the covering and such conductors may be furnished with a cover of insulative material, e.g. polythene, and the cable covering may be of polyvinyl chloride or other insulative material.

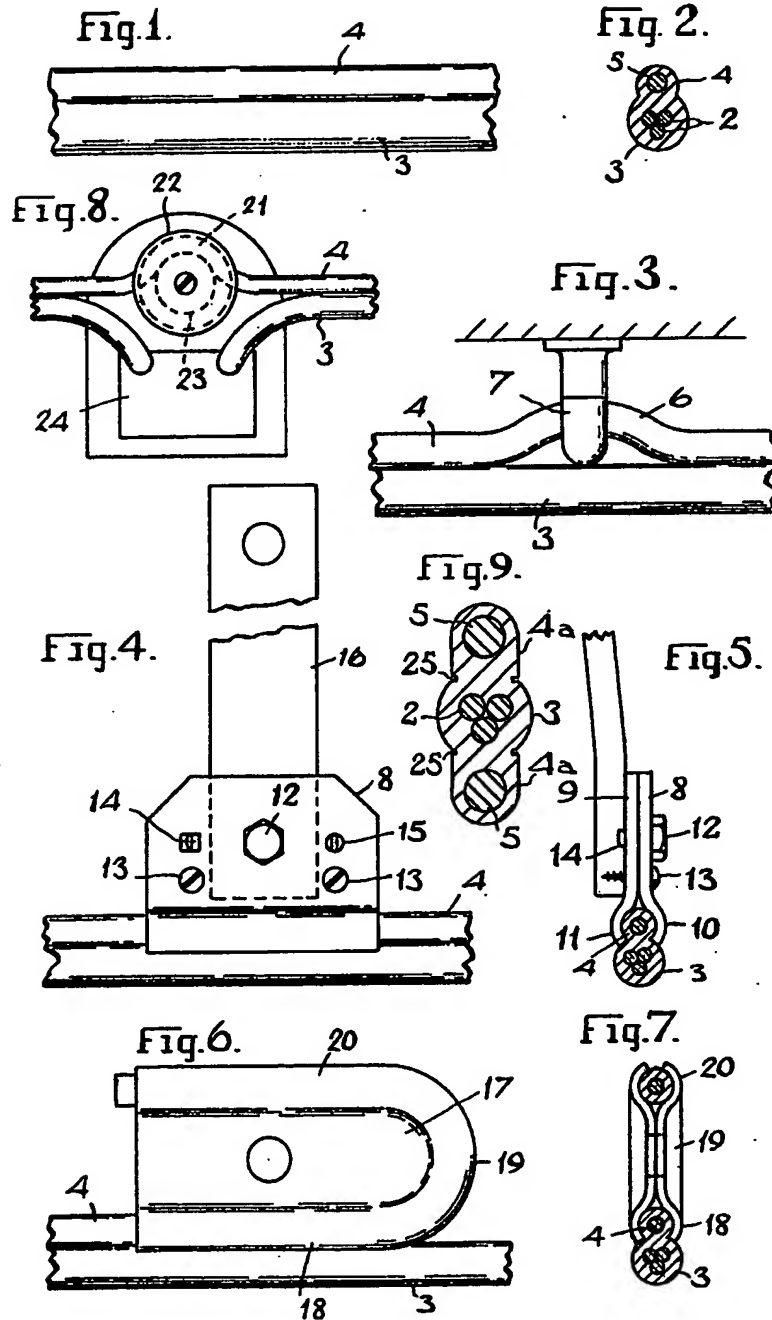
The improved cable according to this invention may be used in a wiring system and connected up to a junction box at which point the catenary cable may be severed and slit back on each side of the cut so as to be secured by cleats or other fixing means to a structure adjacent the junction box, or even to the junction box itself. The catenary wire in its covering may even be slit away from the cable and looped to be held by means on the junction box or an adjacent structure leaving the conductors to be passed into the junction box in known manner.

In a particular embodiment of this invention the improved electric catenary cable may have one or more conductors of usual form and covered by, say, polythene or other insulative material laid in a covering of polyvinyl chloride or other insulative material. The section of the cable may be round but with an integral projecting ridge of the polyvinyl chloride covering housing a catenary wire, say a steel wire, which can be of stranded formation, and this wire lies within its covering along the periphery of the cable covering. In this manner a cable so constructed can have cleats or clips or other securing means furnished to grip the ridge cored by a wire so that no damage is done to the cable proper but it can be easily suspended or stretched between desired supporting points. Alternatively, the cable can have the ridge slit away from it where required to form a shallow or deep loop which can be either simply hung or secured on supporting means or have supporting means secured thereto. When the ridge with the catenary wire is so separated the catenary wire will still be entirely covered by the insulative material and there will be a complete covering of the conductor or conductors.

A particularly suitable type of cleat for securing the catenary cable comprises a pair of complementary plates which when secured together provide gripping tongues or flanges to embrace the ridge containing the catenary wire. These plates may have dished or otherwise formed spacing parts and the gripping tongues or flanges may run along one or both opposite edges, on three edges, or even run right round the cleat plate according to requirements. Said plates could be held together by a bolt or other securing device and such device may be secured to a fixing bracket or other means or structure. When the catenary cable reaches a junction box it can be severed, the catenary wire can be slit back to separate the ridge enclosing the catenary wire from the cable proper and a cleat, according to the aforesaid description, furnished to secure the catenary wire and thus the cable with the required mechanical tensile strength between the fixing points. The cable proper is entered into the box for electrical connection in known manner. In a convenient arrangement the cleat may be constructed so that the catenary wire is gripped along say the lower edge, passed round one end and turned back along an opposite edge so that in effect it becomes hook-shaped in formation with the cleat having a good grip thereon to take the strain. Any of the cleats may be constructed to facilitate the grip on the catenary wire by crimping it, serrating it, furnishing complementary indents and projections or any other means which will give a good grip on the wire according to requirements. The bracket which supports the cleat can also be adapted to carry a junction box or other device or the bracket may carry more than one cleat according to requirements. Although these cleats have been found eminently suitable for securing the catenary wire any other form of securing device may be adopted as required.

In a modification the catenary wire cored ridge may be slit away from the cable proper to furnish a shallow loop which can be simply suspended on a support or be gripped by a clip or other securing device or it can be adapted to form a deeper loop which can be gripped by a securing collar or other means carried by a junction box or adjacent structure.

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